A new land snail of the genus *Humboldtiana* (Gastropoda: Pulmonata: Humboldtianidae) from Nuevo León, Mexico

Fred G. Thompson
Florida Museum of Natural History
University of Florida, Box 117800
Gainesville, FL 32611-7800 USA
fgt@flmnh.ufl.edu

ABSTRACT

Humboldtiana iversoni new species is described from southern Nuevo León, Mexico. The species is most similar to *H. montezuma* Pilsbry, 1940, because of its reproductive system morphology and shell sculpture. The new species differs from *H. montezuma* by its smaller size, its color pattern and aspects of the structures of its reproductive system. It is unique within the genus because of its bulbous penis and its short, broadly conical vagina. Because of features of the dart apparatus in the female reproductive system *Humboldtiana inferior* Pilsbry, 1948, is recognized as a distinct species from *H. montezuma*, of which it was considered a subspecies formerly.

INTRODUCTION

Humboldtiana is a genus of large helicoid land snails (Gastropoda, Pulmonata, Helicoidea, Humboldtianidae). The genus is distributed from Texas and Chihuahua south to areas near Mexico City and central-western Veracruz. Approximately fifty species are recognized (Thompson, in press), and it is apparent that many more wait to be discovered. One such novelty was collected by John B. Iverson many years ago during herpetological investigations in northeastern Mexico. Repository institutions are: UF: Florida Museum of Natural History, University of Florida; ITCV: Instituto Tecnologico de Ciudad Victoria, Tamaulipas, Mexico.

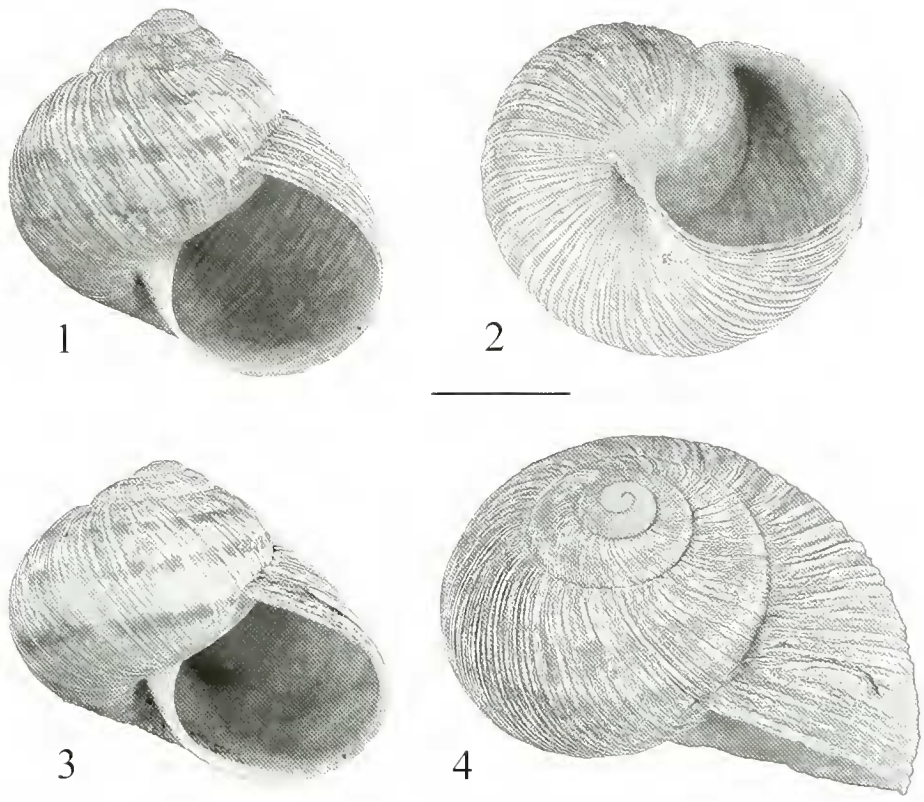
SYSTEMATICS

Family Humboldtianidae Pilsbry, 1939
Genus Humboldtiana von Ihering, 1892

Humboldtiana iversoni new species

Description: The shell (Figures 1–4) is small to medium for the genus, helicoid, up to about 35 mm wide, about 0.85–1.00 times as high as wide. The color pattern consists of three narrow brown bands (Figures 1, 3). The middle band is the most conspicuous. The bands are partially interrupted by white riblets on a tan or light-brown background color. The internal surface of aperture is tinged light tan in fresh specimens. The bands are barely distinguishable within the aperture. The suture is shallow, and descends abruptly to the aperture from the middle band to the lower band along the last eighth whorl. The whorls are weakly shouldered and nearly uniformly rounded. Adult shells have 4.0–4.6 whorls. The embryonic shell consists of 1.4–1.6 whorls. The first embryonic whorl is smooth, flat-topped, and 2.25 mm wide perpendicular to the initial suture. The following half whorl is covered with numerous very fine elliptical granules and has faint radial striations below the periphery. The post-embryonic whorls are sculptured with numerous close growth wrinkles and dense, fine, elongate granules that are aligned transversely (Figure 4). On the last 1.5 whorls the wrinkles become well-defined riblets that are about as wide as their interspaces. The riblets are continuous into the umbilicus. Transverse rows of granules are superimposed on and between the riblets. The aperture is nearly round in frontal view and is 0.76–0.82 times as wide as high in oblique view. The plane of the aperture lies at an angle of 37–43° to shell axis. The posterior corner is rather widely separated from the columellar margin. The parietal callus consists of a thin transparent glaze. The peristome is simple and blunt-edged. The basal-columellar edge is slightly reflected. The columellar lip is narrowly reflected to partially cover the umbilicus (Figure 2). Shell measurements in mm based on the holotype and the three paratypes are given in Table 1.

Anatomy (Figures 5–6): (Morphological terminology follows Thompson and Brewer, 2000.) The holotype is the only specimen that was available for study. It was preserved in the field in 70% ethanol, and was tightly contracted into the shell. The head-foot is dark gray. The mantle over the lung is uniform lighter gray. Reproductive system (Figure 5): The genital atrium is very short. The penis has a short narrow neck, and then it rapidly expands into a wide, bulbous orb that is wider than high; length of penis 4.5 mm. The penis wall is very thin. Internally the wall has several longitudinal glandular folds in the neck. The penis has a very large verge that fills the upper half of the cavity and ends in four heavy



Figures 1–4. *Humboldtiana iversoni* new species. Shells. **1–2.** Holotype, UF 103588. **3–4.** Paratypes, UF 367594. **3.** Paratype A. **4.** Paratype B. Scale bar for Figures 1–3 = 10 mm. Figure 4 is enlarged 25% in relation to Figures 1–3.

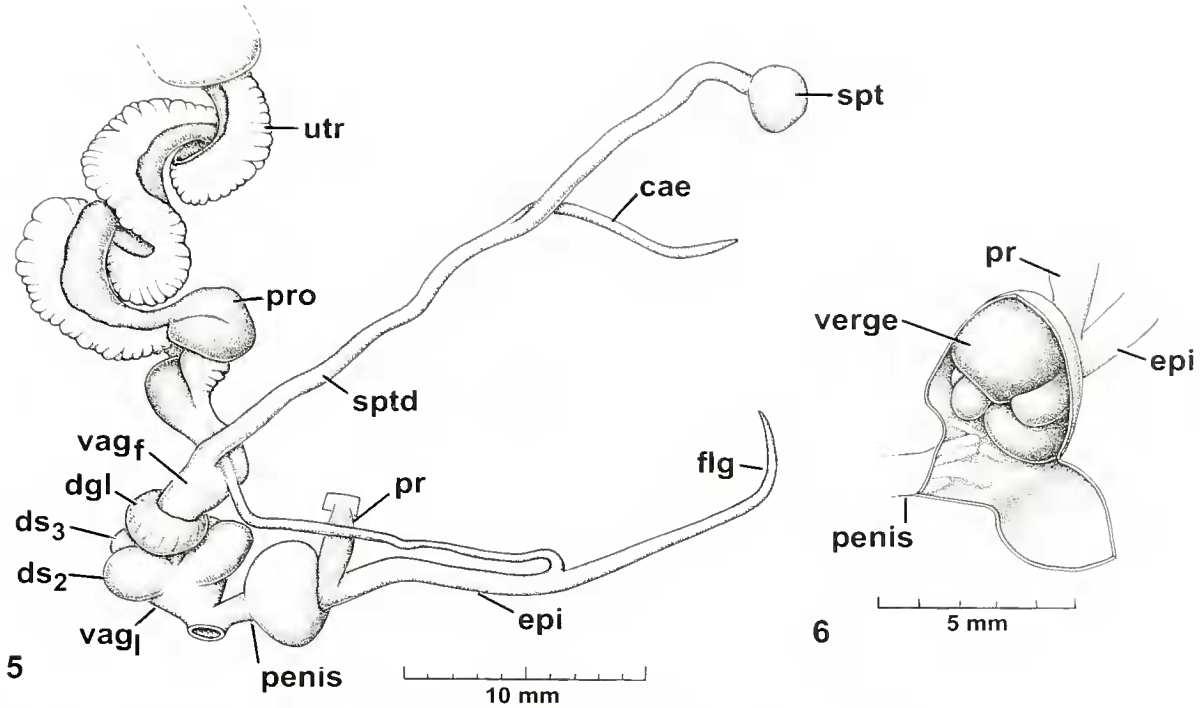
lobes (Figure 6). The penis retractor muscle **(pr)** is short and stout; length 3.5 mm. It originates on the center of the mantle cavity about 1/8 of a whorl behind the mantle collar and inserts on the base of the epiphallus **(epi)** juxtaposed to the penis. It does not form a sheath around the epiphallus. The epiphallus is 11.5 mm long. It is moderately slender and uniformly wide throughout its length, being about the same diameter as the neck of the penis. It is lined internally with four longitudinal folds. The flagellum **(flg)** is 13 mm long. It is slightly longer than the epiphallus, is moderately stout, and bears four longitudinal folds internally. The vagina **(vg_1)** is short and stout with a broad conical base; total length of vagina 7.5 mm. The vagina bears four dart sacs **(ds)** of equal size. Dart bulbs are not evident externally. The dart glands **(dgl)** form around the vagina a robust ring that is juxtaposed to the dart sacs. The free vagina **(vgf)** is robust and is about 2.5 mm long. The spermathecal duct (sptd) is 27 mm long. It bears a caecum **(cae)** 16 mm above it base. The caecum is 9 mm long. The spermatheca is oval in shape and is relatively small for the genus. Measurements could not be made of the uterus **(utr)** or the albumen gland because of their state of preservation.

Type Material: Holotype, UF 130588; Paratypes, UF 367594 (2), ITCV (1); same data as the holotype; all collected by John B. Iverson, 18 June 1978, at type locality.

Type Locality (Figure 7): Nuevo León; Highway 68 at km post 116, Las Norias (24°11.0' N, 99°53.0' W), 3 km south of Anteojitos; 1800 m altitude. Las Norias is about 50 km SE of Galeana on the highway to La Escondida and Doctor Arroyo. Specimens were found under limestone blocks on an open southeast facing grassy hillside with nearby scattered oaks (*Quercus* sp.) and clusters of *Agave* sp.

Table 1. *Humboldtiana iversoni* new species. Shell measurements in mm of the holotype and three paratypes. H: shell height; W: shell width; AW: aperture width; AH: aperture height; AA: angle of aperture to shell axis.

	H	W	AW	AH	Whorls	H/W	AW/W	AH/H	AW/AH	AA
Holotype	28.6	28.5	16.0	20.6	4.4	1.00	0.56	0.72	0.78	37°
UF	27.3	29.2	16.4	21.7	4.3	0.93	0.56	0.79	0.76	39°
UF	24.4	28.8	15.1	18.5	4.0	0.85	0.52	0.76	0.82	43°
ITCV	30.6	35.6	17.8	22.7	4.6	0.91	0.50	0.75	0.78	40°



Figures 5–6. *Humboldtiana iversoni* new species. **5.** Reproductive system. **6.** Interior of penis.

Distribution: The species is known only from the type locality.

Etymology: This species is named for John B. Iverson, Earlham College, Richmond, Indiana, in acknowledgement for this and other novel species of mollusks collected by him in Mexico while conducting herpetological explorations.

Remarks: *Humboldtiana iversoni* belongs in the subgenus *Humboldtiana*, or at least, what is thought to be the subgenus *Humboldtiana*. The identity of the type species, *Helix humboldtiana* Pfeiffer, 1857, remains equivocal, and its type locality and range are unknown (Pilsbry, 1927). It was described from "Mexico" without a specific locality. Fischer (1899) described and illustrated the anatomy of a specimen from Guanajuato that he identified as *H. humboldtiana*, but he did not describe or illustrate the shell, nor is it clear whether he meant the City of Guanajuato or the State of Guanajuato. For these reasons Pilsbry (1927) expressed reservation concerning the identity of Fischer's specimen. Notwithstanding the limitations concerning the identity of the type species, the subgenus is tentatively characterized as follows, because all other species described in the 19th Century and all species subsequently described from central and southern Mexico are known anatomically, and there is little reason to doubt that *H. humboldtiana* departs significantly from a common ground plan. This includes Fischer's description. These species have in common the following characteristics: (1) The spermathecal duct has an appendix; (2) There are four dart sacs on the vagina; (3) Two dart bulbs are imbedded in the vaginal wall at the base of each sac and are not visible externally; (4) The four dart glands coalesce immediately above the dart sacs to form a ring around the vagina; and (5) The penis contains a verge internally, which is a papilla-like extension of the epiphallus into the penis chamber.

Humboldtiana iversoni belongs to a small group of species that includes *H. montezuma* Pilsbry, 1940, and *H. inferior* Pilsbry, 1948 (formerly *Humboldtiana montezuma inferior* Pilsbry, 1948). The group is found in southeastern Nuevo León. *Humboldtiana montezuma* is found at 3080 m altitude at the summit of El Infiernillo, a mountain near Pablillo, south of Galeana; and *H. inferior* is found lower at about 1850 m altitude, near Pablillo. The species have in common coarse postembryonic

Figure 7. Type locality of *Humboldtiana iversoni* new species at Las Lorias, Nuevo León, Mexico.

sculpture of close thread-riblets and minute beaded granules that are aligned on or between the riblets. The color pattern consists of light-colored ribs on a light brown or yellowish background. Spiral bands are absent in adult shell, or when present they are weakly defined. The female reproductive system has four dart sacs on the vagina, and the dart glands form a ring around the vagina just above the dart sacs.

Humboldtiana iversoni is unique within *Humboldtiana* because of the structure of the penis with its very large bulbous verge. Also, it is unusual because of the short, broadly conical lower vagina. Superficially the penis resembles that of *H. tescola* Thompson, 1967. In the latter species the inner wall of the penis bears heavy glandular folds that surround a short and relatively slender verge, and the penis retractor muscle inserts on the epiphallus (Thompson, 1967). *Humboldtiana iversoni* differs from other members of the *H. montezuma* species-group by having a short, stout flagellum that is only slightly longer than the epiphallus, and by having the penis retractor muscle insert on the base of the epiphallus. Both *H. montezuma* and *H. inferior* have a long slender flagellum that is 1.3–1.6 times as long as the epiphallus, and the penis retractor inserts higher on the epiphallus (Pilsbry, 1948). *Humboldtiana iversoni* is like *H. montezuma* by having four equal-sized dart sacs on the vagina. In *H. inferior* dart sacs ds_2 and ds_3 are reduced in size compared to ds_4. *Humboldtiana montezuma* lacks bands, while *H. inferior* has three bands. In both *H. montezuma* and *H. inferior* the internal surface of the aperture is brown, in contrast to light tan-tinged aperture of *H. iversoni*.

Humboldtiana inferior had been regarded as a subspecies of *H. montezuma*. Pilsbry (1948) states that the dart sacs of *H. inferior* are sub-equal in size, and his Fig. 1B shows that at least ds_2 and ds_3 are conspicuously smaller than is $\mathbf{ds_4}$. The reduced size of dart sacs $\mathbf{ds_2}$ and $\mathbf{ds_3}$ is a sufficient basis for recognizing *Humboldtiana inferior* as a separate species (see Thompson and Brewer, 2000).

ACKNOWLEDGMENTS

The anatomical drawings in Figures 5–6 were produced by Susan Trammell, Gainesville, Florida. Her excellent illustrations greatly enhance this paper. I am grateful to two anonymous reviewers whose comments improved this paper.

LITERATURE CITED

Fischer, H. 1899. Note sur l'*Helix humboldtiana* Valenciennes avec quelques remarques sur le sous-genre *Lysinoe* et sur la section *Odontura*. Journal de Conchyliologie 47: 297–304, figs. 1–3.

Pilsbry, H. A. 1927. The structure and affinities of *Humboldtiana* and related helicid genera of México and Texas. Proceedings of the Academy of Natural Science of Philadelphia 79: 165–192, pls. 11–14.

Pilsbry, H. A. 1940. Two new species of Mexican *Humboldtiana*. The Nautilus 53: 140–141.

Pilsbry, H. A. 1948. Island Mollusca of northern Mexico. I. The genera *Humboldtiana, Sonorella, Oreohelix* and *Ashmunella*. Proceedings of the Academy of Natural Sciences of Philadelphia 100: 185–203; pls. 12–14.

Solem, A. 1954. Notes on Mexican mollusks. I: Durango, Coahuila and Tamaulipas, with descriptions of two new *Humboldtiana*. The Nautilus 68: 3–10; pl. 1.

Thompson, F. G. 1967. A new helicid snail from Zacatecas, México. Nautilus. 81(1): 22–27; Figures 1–4.

Thompson, F. G. and G. P. Brewer. 2000. Landsnails of the genus *Humboldtiana* from northern Mexico (GASTROPODA, PULMONATA, HELICOIDEA, HUMBOLDTIANIDAE). Bulletin of the Florida Museum of Natural History 43: 49–77.

Thompson, F. G. In press. Some land snails of the genus *Humboldtiana* from Chihuahua and western Texas. Bulletin of the Florida Museum of Natural History.